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Educational Writings

REVIEWS AND BOOK NOTES

Difficulties in reading arithmetic examples.—A comparatively novel problem, or set of problems, has been attacked in a highly suggestive study[1] by Dr. Terry. The monograph is frankly "only an introduction to the study of the methods employed by children in their gradual acquisition of the power of reading numerals" (p. 1). While only adult subjects were used in the experimental work, the author succeeds in pointing out many educational implications of marked value.

The first part of the experimental work made use very largely of the introspective method in the analysis of the detailed procedure followed in the reading and solution of simple arithmetic problems, with clear distinction of apprehension from first reading and re-reading of passages, and in the reading of numerals of various sizes in columns. In the second part photographic records of eye-movements were made under somewhat similar conditions. The objective evidence here secured is more convincing but is in agreement generally with that of the first part.

Perhaps the chief contribution made by the study lies in calling attention to the fact that there is a special technique of reading numerals, quite distinct from that of reading words, a point which is commonly overlooked. According to this report, this technique consists in locating the beginning and the end of the numerals; perceiving and identifying the respective units; becoming familiar with the numerals or the parts of the numerals to be read, in their various combinations; developing economical habits of many brief eye pauses; definitely organizing and grouping digits, with fixed terminology; etc.

When numerals are included in arithmetic problems the technique is more involved, and especially is this true when computation is the object of endeavor. Since numeral reading makes a greater demand on attention than ordinary word reading, a problem is generally read first as a whole with a view to comprehension of it and the general method of solution. In this first reading there is usually only a partial reading of the numerals involved, especially if they are long and unfamiliar. There is then a re-reading of the problem with attention directed to detailed identification of numbers while copying or computing.

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[1] PAUL WASHINGTON TERRY, *How Numerals are Read: An Experimental Study of the Reading of Isolated Numerals and Numerals in Arithmetic Problems.* Supplementary Educational Monographs, No. 18. Chicago: Department of Education, University of Chicago, 1922. Pp. xiv+110. $1.00.

The practical applications to classroom teaching which the author makes in the last chapter are clear and convincing and in harmony with the best principles of teaching reading. One cannot rest assured that even the most economical or common practices of the adults studied should be taken as an ideal of achievement for children since they represent merely the habituations which an imperfect pedagogy has fixed upon them. But here at least is furnished a new approach to a better understanding of the psychology of arithmetic in some of its phases, which should be taken advantage of in a direct study of childhood and a comparative evaluation of methods.

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New edition of Stone reasoning tests.—In 1908 C. W. Stone published his *Arithmetical Abilities and Some Factors Determining Them.* The exhaustion of the edition of this monograph has been made the occasion for publishing a new manual[1] dealing with arithmetical-reasoning tests and their utilization. The manual is devoted almost entirely to reasoning tests because of the improved instruments that have been designed for the measurement of fundamental operations since the appearance of the original Stone test for this purpose.

The author had two aims in preparing this manual: (1) to supply more help than was earlier given for supervising and teaching the reasoning phases of arithmetic; (2) to further, in some measure, progress in the scientific study of the teaching of arithmetic.

Besides the well-known Reasoning Test I, Stone publishes an additional test, Reasoning Test II, and also provides a preliminary test in reasoning for use with both I and II. The preliminary test is not available in printed form, but the others can be procured from the Bureau of Publications, Teachers College, Columbia University.

In addition to copies of the tests mentioned, there are presented in the manual detailed directions for administering and scoring the tests, standards for each of four bases of scoring, graphic means of representing scores, and methods of utilizing results.

For many years it has been agreed that computational skill and reasoning ability are the two leading objectives in the teaching of arithmetic. The relative importance of the two has not been determined, but if one were to judge by the attention given to computation by teachers and measuring experts, there could be but one conclusion. It seems clear that arithmetical reasoning has been comparatively neglected by teachers and test-makers. One can

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[1] CLIFF W. STONE, *Standardized Reasoning Tests in Arithmetic and How to Utilize Them.* Teachers College Contributions to Education, No. 83. New York: Teachers College, Columbia University, 1921 (revised and enlarged). Pp. v+33.